



State of Utah
DEPARTMENT OF NATURAL RESOURCES
DIVISION OF OIL, GAS AND MINING

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May 3, 1995

Randolph Gainer, Environmental Manager
Genwal Resources, Inc.
P. O. box 1420
Huntington, Utah 84528

Re: LBA #9 and Longwall Mining Review, Genwal Resources, Inc., Crandall Canyon Mine, ACT/015/032-94F and 95C, Folder #3, Emery County, Utah

Dear Mr. Gainer:

As we discussed in my office on May 2, 1995, the review of Genwal's plans has been completed. This review included responses to the LBA #9 stipulations as well as revised plans for implementation of Longwall mining. At this time there are two items that need additional response (roof failure & air quality). They are discussed in the enclosed review document. Please examine the document carefully. You will need to respond to the two requirements by no later than May 17, 1995.

Please call if you have any questions.

Sincerely,

Daron R. Haddock
Permit Supervisor

enclosure

cc: P. Grubaugh-Littig
W. Western
S. Falvey

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**TECHNICAL ANALYSIS AND FINDINGS
RESPONSE TO LBA #9 STIPULATIONS AND LONGWALL MINING**

**GENWAL RESOURCES, INC.
ACT/015/032-94F & 95C**

May 3, 1995

ANALYSIS of F. S. Stipulations

**Page 3-8, Section 3.22.22, 5th paragraph and
Page 3-17, 3rd paragraph**

Genwal must immediately notify the F.S. whenever the flow of a seep or spring changes, other than variations which directly correlate with precipitation changes. They cannot wait until a determination of the cause has been made.

Analysis:

The Permittee has amended page 3-8 to indicate that, "If during the monitoring of the springs, it is determined that the flow rate has decreased (and that the decrease is not associated with verified climatic changes) at any seep or spring in the area, Genwal would notify the Division of Wildlife Resources, the Division of Oil Gas and Mining and the U.S. Forest Service. If it is proven that mining operations and activities have impacted the seep or spring then Genwal will begin working on an acceptable mitigation plan involving the use of guzzlers or other approved methods."

Finding:

The Operator has met the requirements of the F.S. and minimum requirements of this section.

Page 3-17, 2nd Paragraph and Page 3-35, 2nd paragraph

Genwal must conduct spring and fall macroinvertebrate studies every three years. They have only committed to do surveys until the year 2000, but they plan to be mining until at least the year 2005.

Analysis:

The Permittee has identified that additional aquatic macroinvertebrate studies have been preformed in 1994. The Applicant agrees to conduct additional aquatic macro invertebrate studies in the spring and fall of 1997 (as agreed to by the Price Office of the F.S.). Thereafter, Genwal will conduct additional monitoring in the spring and fall of 2000 and every three years thereafter for the

life of the mine (unless the study data indicate a different schedule).

Findings:

The Operator has met the request of the F.S. and has provided a measure to monitor affects of mining on the aquatic community.

Section 5.25.

The potential for subsidence under perennial streams must be discussed and calculations shown for roof support between pillars where there is less than 400 feet of overburden.

SUBSIDENCE CONTROL PLAN

Regulatory Reference: 30 CFR Sec. 784.20, 817.121, 817.122; R645-301-521, -301-525, -301-724.

Operator's Response:

Perennial streams within the permit area are protected from subsidence by Genwal's commitment to only conduct first mining under perennial streams and their associated buffer zones. As stipulated by the Price office of the U.S. Forest Service, a factor safety of 2.5 will be used under perennial streams with cover less than 1000 feet and a safety factor of 2.0 will be used in areas of more than 1000 feet of cover.

Thus, these data show that Genwal is protecting the perennial streams by their mine plans and commitments to the factors of safety required by the Price Office of the U.S. Forest Service.

In determining the factor of safety for the mine roof, with cover of 400 feet or less (the potential for failure of the roof which may lead to subsequent subsidence under a perennial stream), several factors need to be understood. They are:

- A. With depth, pillar stresses are greater. Therefore, with reduced amounts of overburden pillar, stresses become less and are not factors in roof failure (i.e., with less depth the pillars are not going to "push" their way through the immediate overburden units).
- B. With decreased overburden depths the potential for compressive failures decrease and the potential for tensile failures increase.
- C. The type (sandstone, shale, mudstone, etc.) and associated strength of the overburden which comprises the roof (immediately overlying the coal) has a significant role in determining the potential for failure.
- D. The width of the entry, length of the beam from pillar to pillar is a critical factor.

To determine the factor of safety for a self-supporting roof which does not utilize artificial support (roof-bolts), the equation for a simply supported beam is used.

If the immediate roof is eight inches thick sandstone roof the safety factor is 3.8 and increases to 57.6 for a ten foot thick sandstone roof.

Analysis:

The Operator assumed that the immediate roof consists of a single sandstone bed but did not give any justification. Usually the immediate roof consists of several beds.

When the immediate roof is composed of more than one bed upper less rigid beds will be partly supported by the bottom bed, increasing the load on the bottom bed. To determine where bed separation will occur and what the load on the bottom bed will be the Operator should use the following equation:

$$q_1 = \frac{E_1 d_1^3 (\gamma_1 d_1 + \gamma_2 d_2 + \gamma_3 d_3 + \dots + \gamma_n d_n)}{E_1 d_1^3 + E_2 d_2^3 + E_3 d_3^3 + \dots + E_n d_n^3}$$

where:

n = number of beds comprising the immediate roof with bed 1 the bottom bed

q = intensity of the transverse load

E = modulus of elasticity

d = depth or thickness of beam or plate

γ = unit weight

The beam equations are not valid for intersections. The Operator needs to use either plate theory or numerical methods to show that roof failure will not occur.

Findings:

The Operator needs to analyze the potential for roof failure using a multiple bed technic. Analysis of the roofs above the intersections must be done using plate theory or numerical techniques.

Page 7, Pumping From Crandall Creek

Genwal has committed not to dewater Crandall Creek. They should actually commit to maintaining a minimum in-stream flow which will be determined during 1995.

Analysis

The Operator has responded to the F.S. in a memo not incorporated in the plan. However, the Operator's existing plan commits to provide minimum in-stream flows to maintain the flora and fauna of the stream by August 31, 1995 (page 7-33, revised 8/31/94).

Findings:

The Permittee will meet permit commitments and fully satisfy the F.S. concerns when the August 31, 1995 plan for minimum in-stream flows is completed. The plan is considered complete at this time based on this commitment.

Page 7, Water Quality Impacts

Genwal is aware that they are impacting Crandall Creek by the salt used for ice removal and by coal dust. Both of these items must be addressed and appropriate mitigation proposed. The coal dust may become more of a problem as coal increases from 1.6 million tons per year to approximately 2.5 million tons per year.

Analysis:

At this time areas impacted were identified as outside of the permit area from salting the access road, a F.S. road. These impacts, although they may be indirectly attributed to mining, are directly related to the operation of the F.S. Road and are not considered part of the Mining and Reclamation Plan.

The Operator has an Air Quality Permit, issued in 1992, for removing 1.5 million tons per year. The Operator's current plan indicates a potential of 1.75 million tons this year and an estimated 2.15 tons per year at the end of year 2000. The Applicant should address this issue with a copy of notice of intent to Air Quality for the total volume of coal estimated to be mined.

Findings:

The existing Air Quality plan is not current for the proposed annual coal production.

Requirements

R645-301-525.200. Subsidence Control

1. The Operator needs to analyze and, submit for inclusion in the Mining and Reclamation Plan, the potential for roof failure using a multiple bed technic. Analysis of the roofs above the intersections must be done using plate theory or numerical techniques.

R645-301-420. Air Quality

1. The Operator should provide an Air Quality Permit which corresponds to the estimated annual coal production and current proposed operating plans.

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